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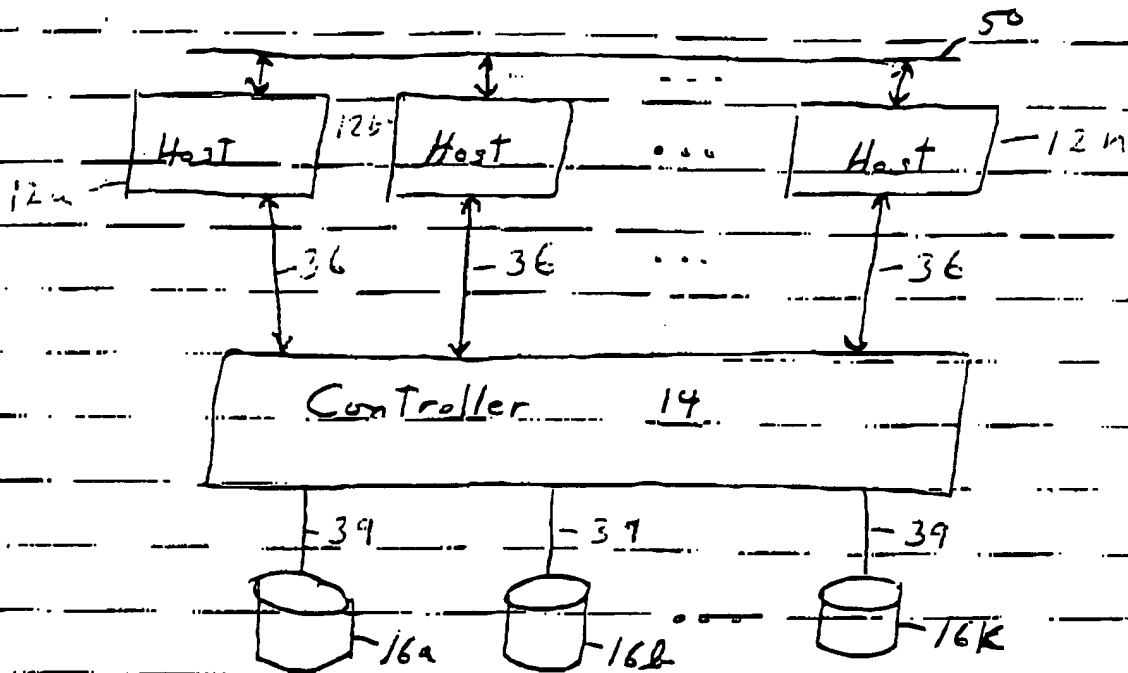


Fig 1

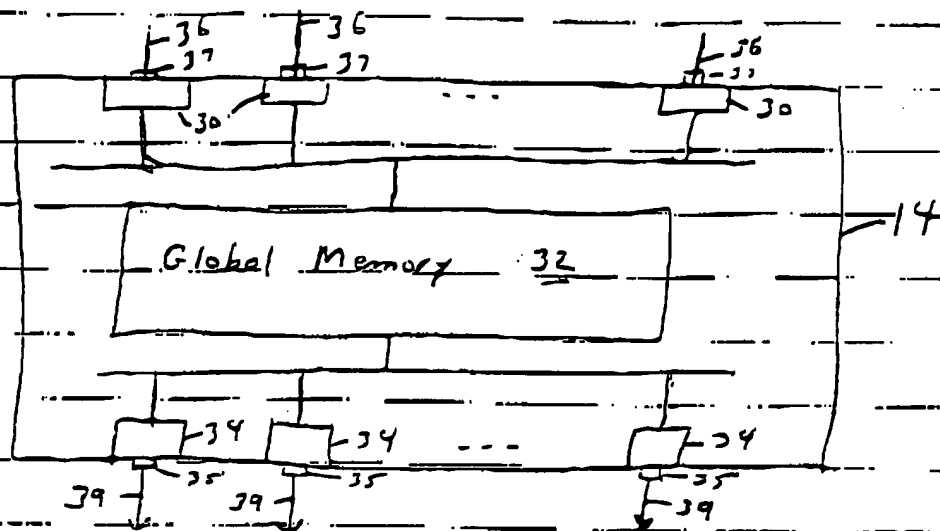


Fig 2

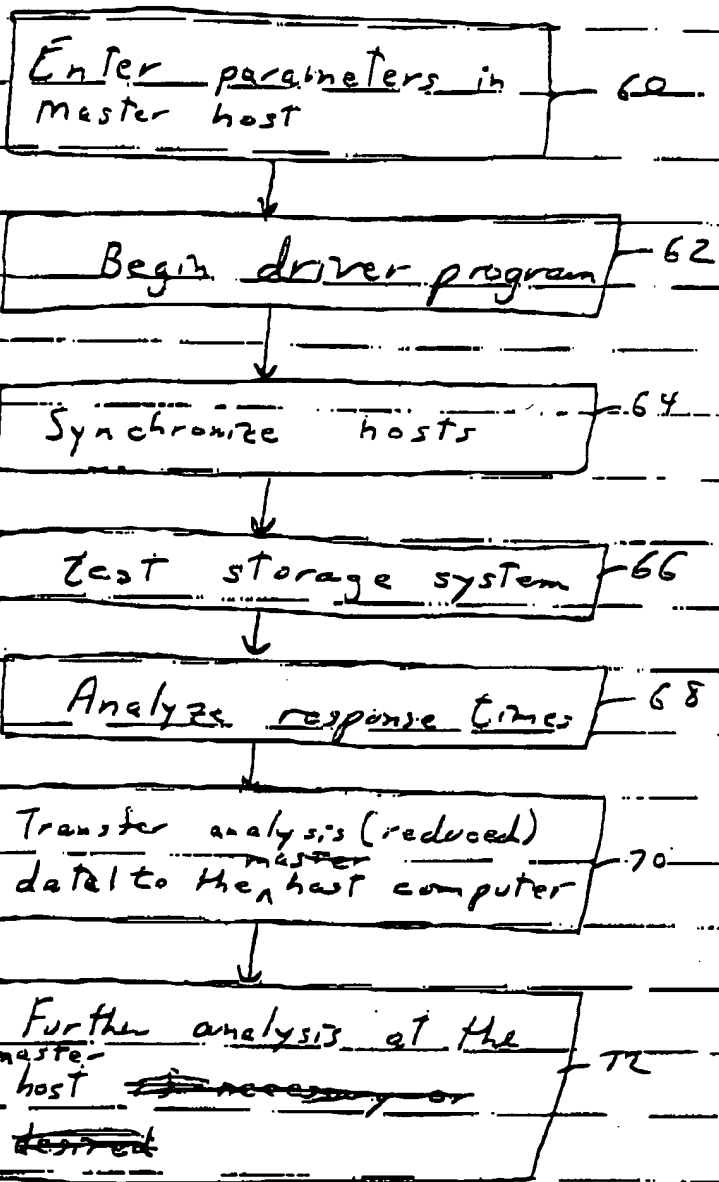


Fig. 3

REQUIRED	Number of logical disks
	Number of "child" processes to start
	Number of capture response times
	Number of response times
	Buffer size
	Offset size
	Maximum range
	Time of test
	read/write size
	read/write mix
	ID of devices being tested
	ID of master & client hosts
	I/O type (sequential or random)
	Number of I/O operations performed to correct offset ^{address}
OPTIONAL	Displacement from offset
	Delay between commands
	Initial byte offset
	Number of seeks for random I/O
	Data reduction method
	ICDA percent hit rate

Fig. 4

START

Read required and
optional Arguments

100

Store Arguments in
data files

102

Use driver program
to set up hosts

106

time synchronize
all hosts

108

transfer configuration
and parameter files
to client hosts

110

initiate test

112

test
complete?
Yes
No

114

reduce collected data

116

Transfer collected data
to master host

118

effect data analysis

120

another
test?
Y
N

104

Further
analysis
data
Yes
No

122

next
configuration

124

Fig 5

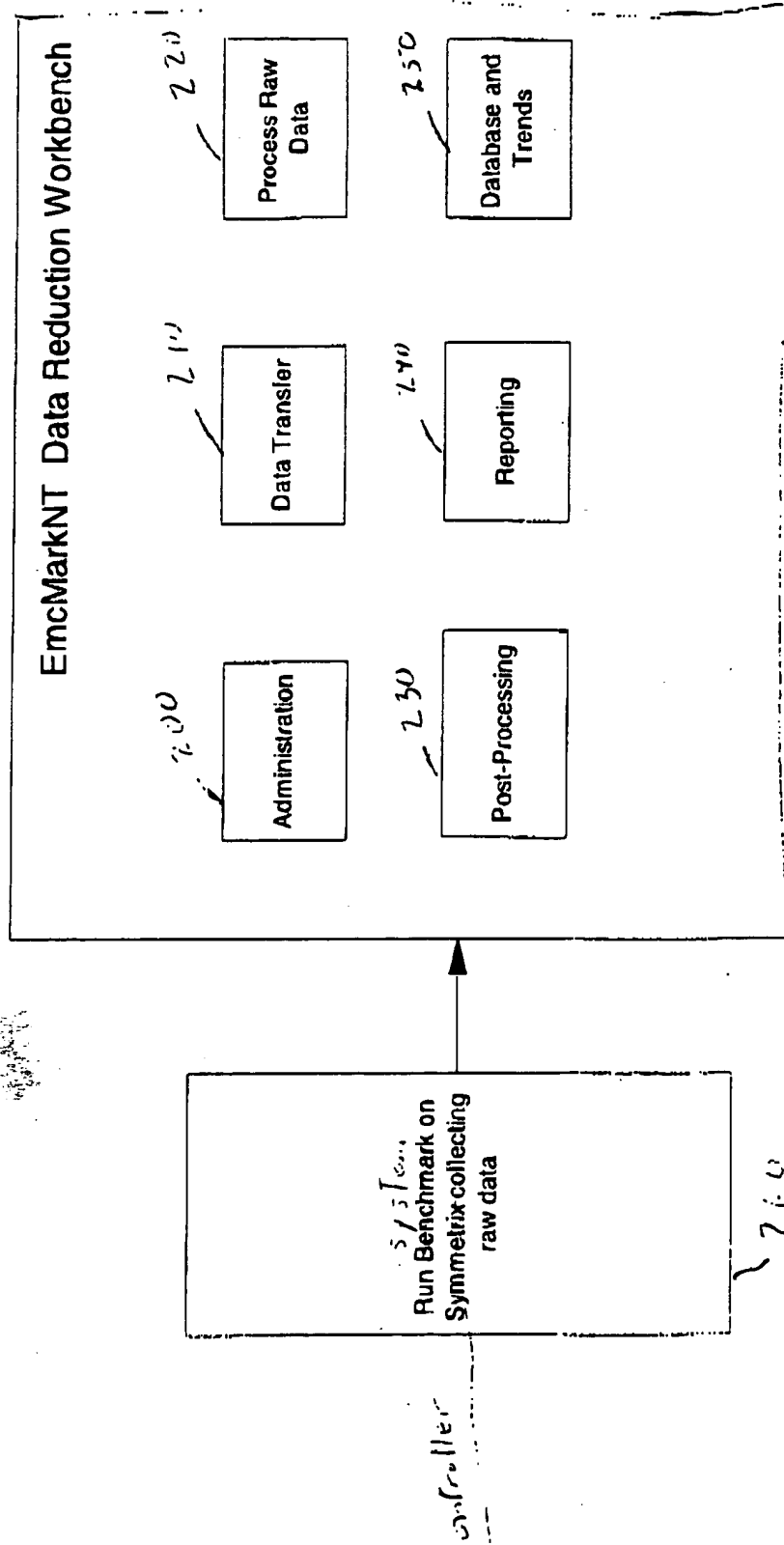


Fig. 6

EmcMarkNT Data Reduction Workbench Flow

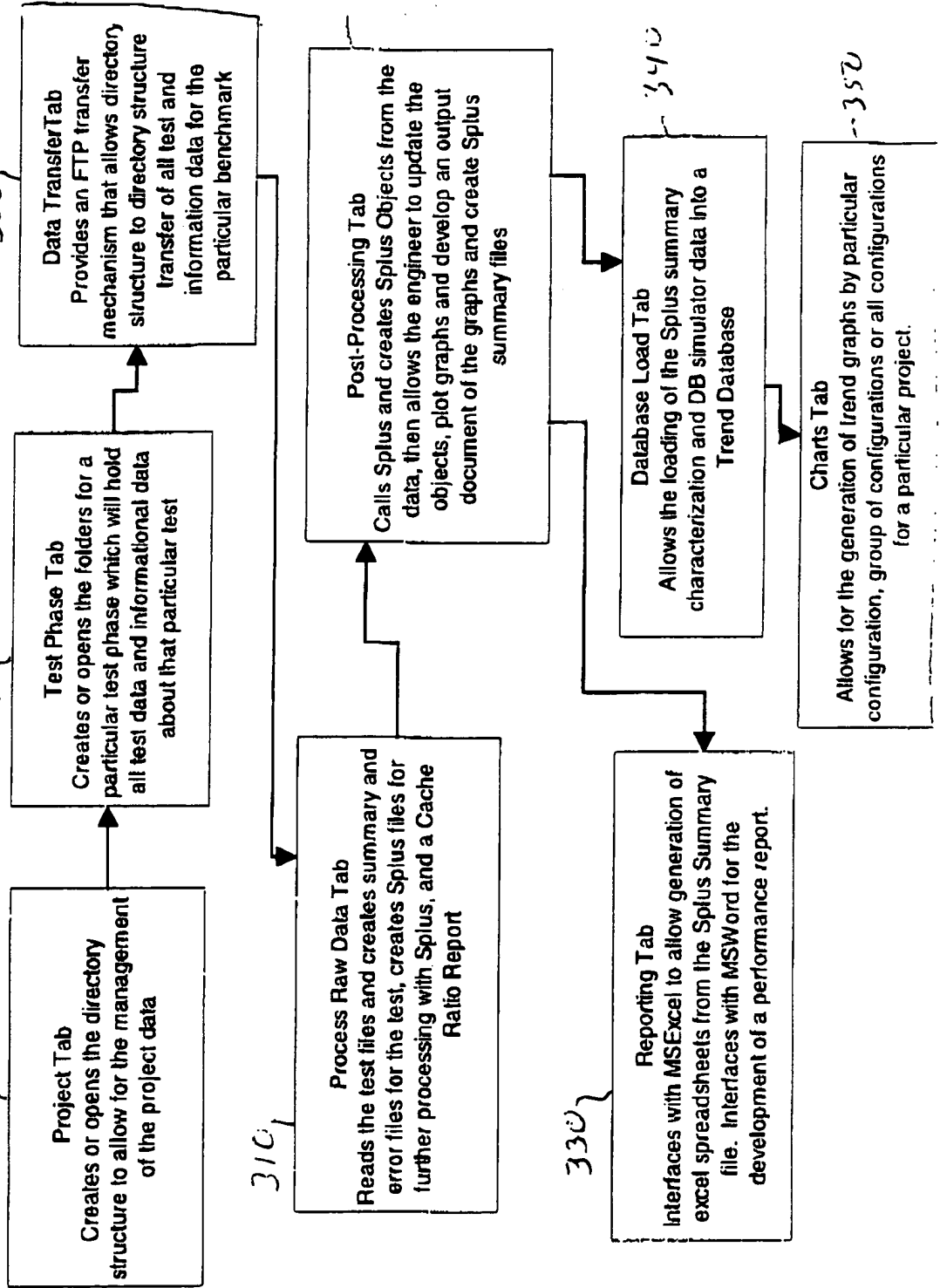
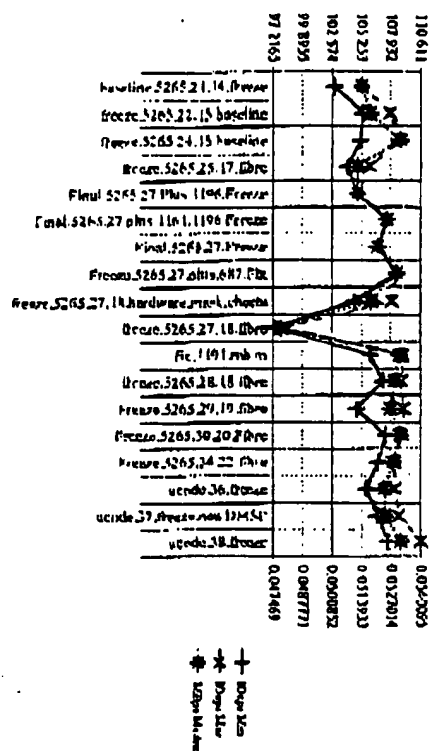
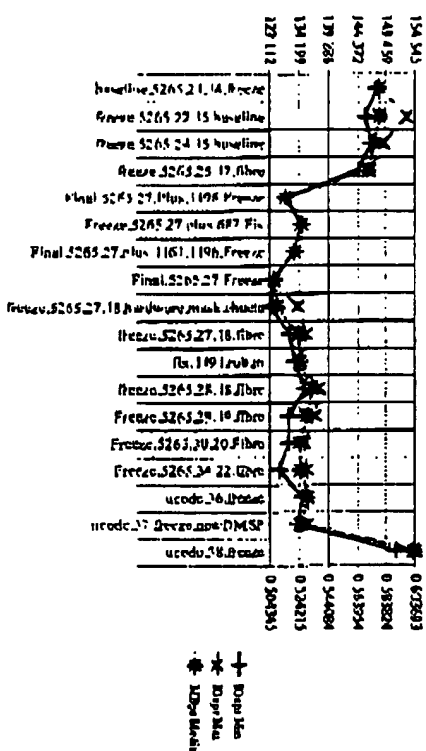


Fig. 7

IOspr and MBps for Random Delayed Fast Write - Req Size 512

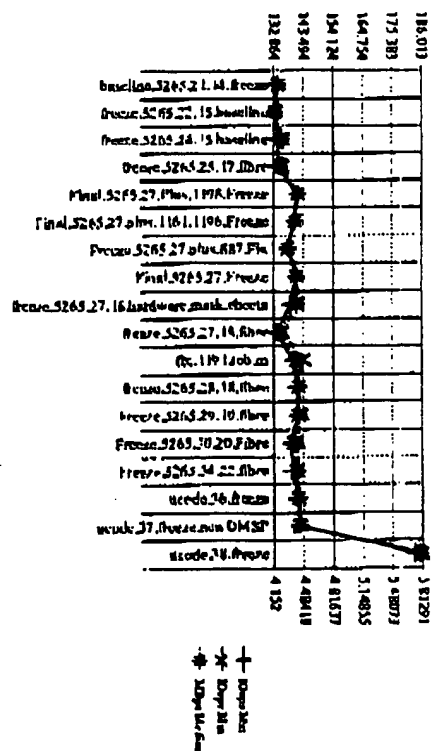


BA. J BAtter. J BAtter. J DA. J DAPoi. J DAPer. J Driv. J Lem. J Hyper. J

Corps and MBPs for Random Dried Fur V'ile - Req Size 4090

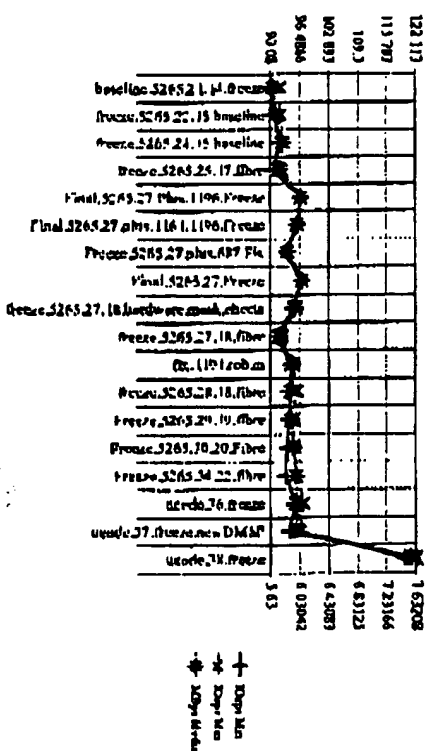
BA-1 BAAlter-1 BAPer-1 DA-2 DAPter-2 DAPert-2 Ditr-2 Lm-1 Hgr-1

10 eps and 1 Eps for Random Delayed Fast Write - Req Size 32768



BA - 1 BAPB - 1 BAPn - 1 DA - 2 DALT - 1 DAPn - 2 Diro - 2 Icu - 1 Kypu - 1

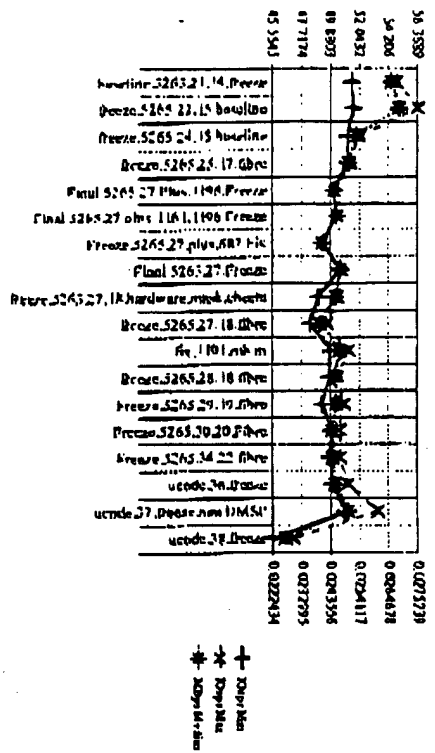
10ops and MBps for Random Delayed Full Write - Req Size 65536



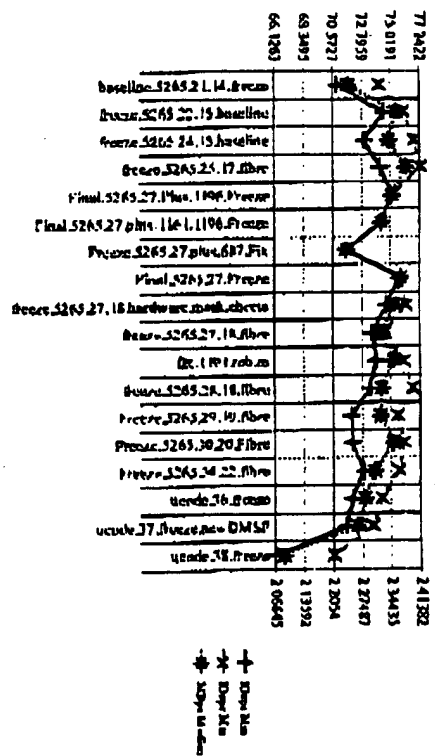
BA / BAFw - 1 BAFm - 1 DA - 1 DAFw - 1 DAFm - 1 Dm - 1 Lw - 1 Bp - 1

Fig 8A

10rps and MBPs for Random Delayed Fast Write - Req Size 112



10sp: and MBP1 for Random Delayed Feed Wtfe. - Req Size 32768



1 Osops und MBPs für Random Delayed Fast Write - Req Size 4096

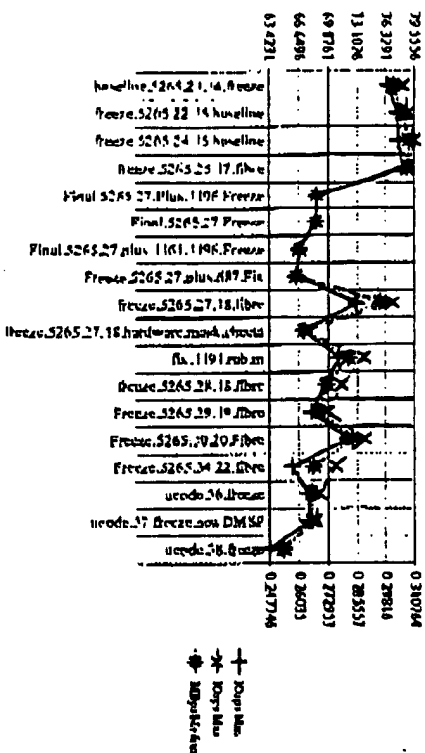
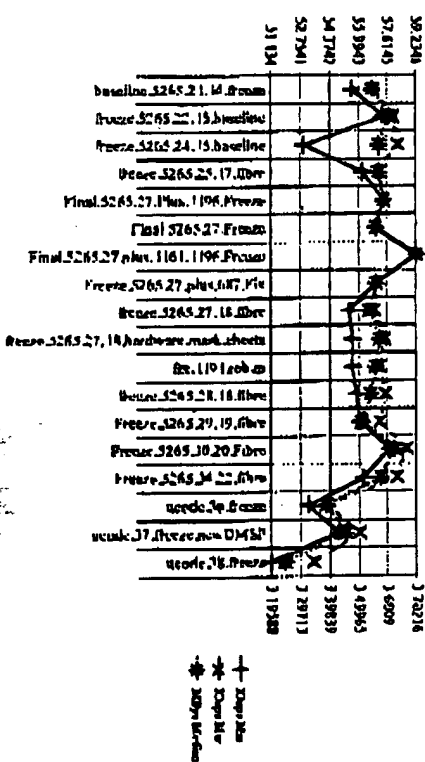
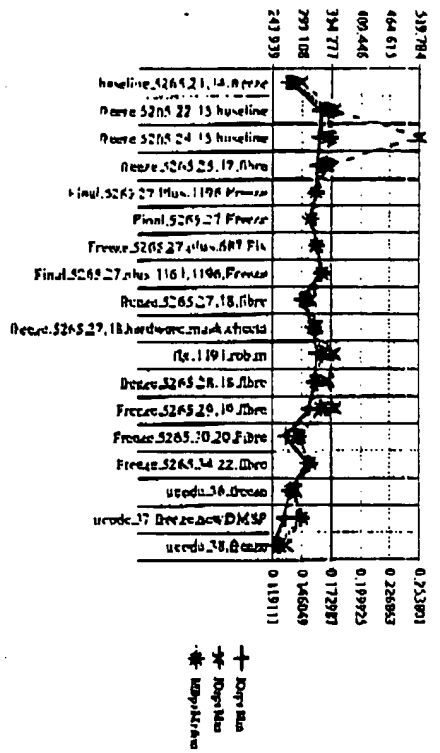
**IOps and MBps for Random Delayed Fast Write - Req Size 65536**

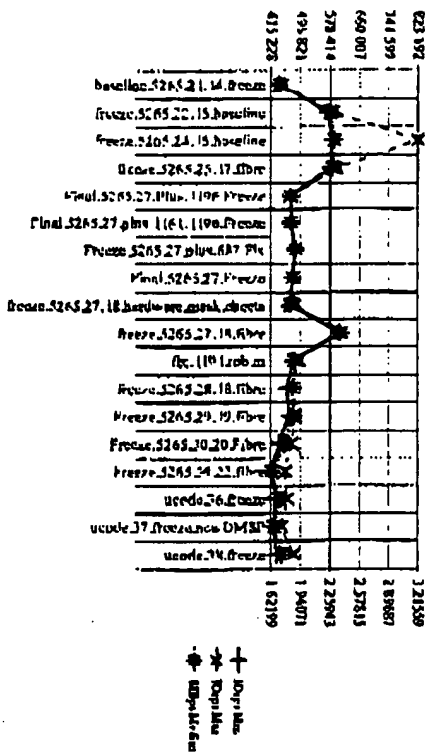
Fig 8B

IOops and MBps for Random Delayed Fast Write - Reg Size 512



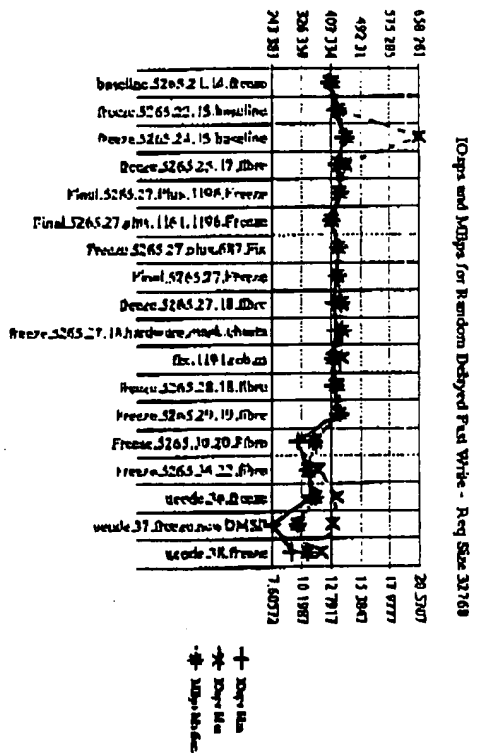
LIN - 4 LANTOI - 8 HASTON - 8 DAVI - 7 DAVTON - 7 DETON - 12 LEA - 24 KUPPER - 4

10Kps and MBps for Random Delayed First Write - Req Size 4096



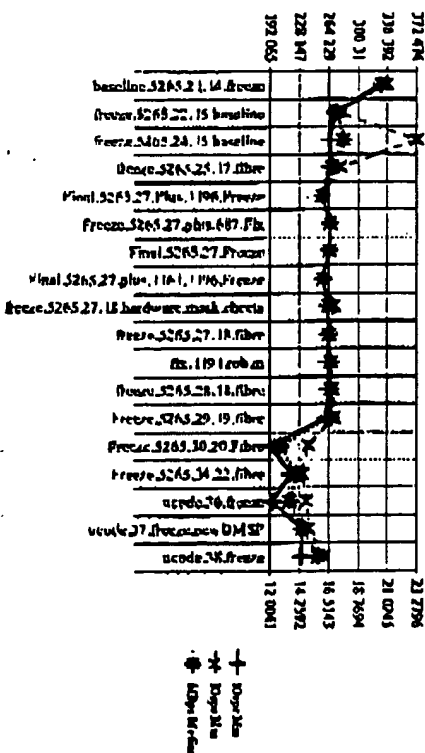
22 - 1 Kauter - 2 BAEFert - 6 DA - 1 DAPro1 - 1 DAPro - 7 Ditriv - 13 Lue - 24 Hipper - 4

EA-4 EAFT-1 EAFT-6 DA-1 DAFT-1 DAFT-2 DAFT-11 DAFT-14 DAFT-6



BA-4 BA701 - 0 BA701 - 0 DA-1 DAIK - 1 DAVN - 1 Dfiri - 12 Lm - 24 Myr - 4

Korps and MBPs for Randoms Delayed Full Write - Reg Size 65536



EA-4 EAFT-1 EAFT-6 DA-1 DAFT-1 DAFT-2 DAFT-11 DAFT-14 DAFT-6

Fig 8C

Post Processing Tab

The Post Processing Tab creates objects, plot graphs and generates summary files using the Splus Data Analysis Software.

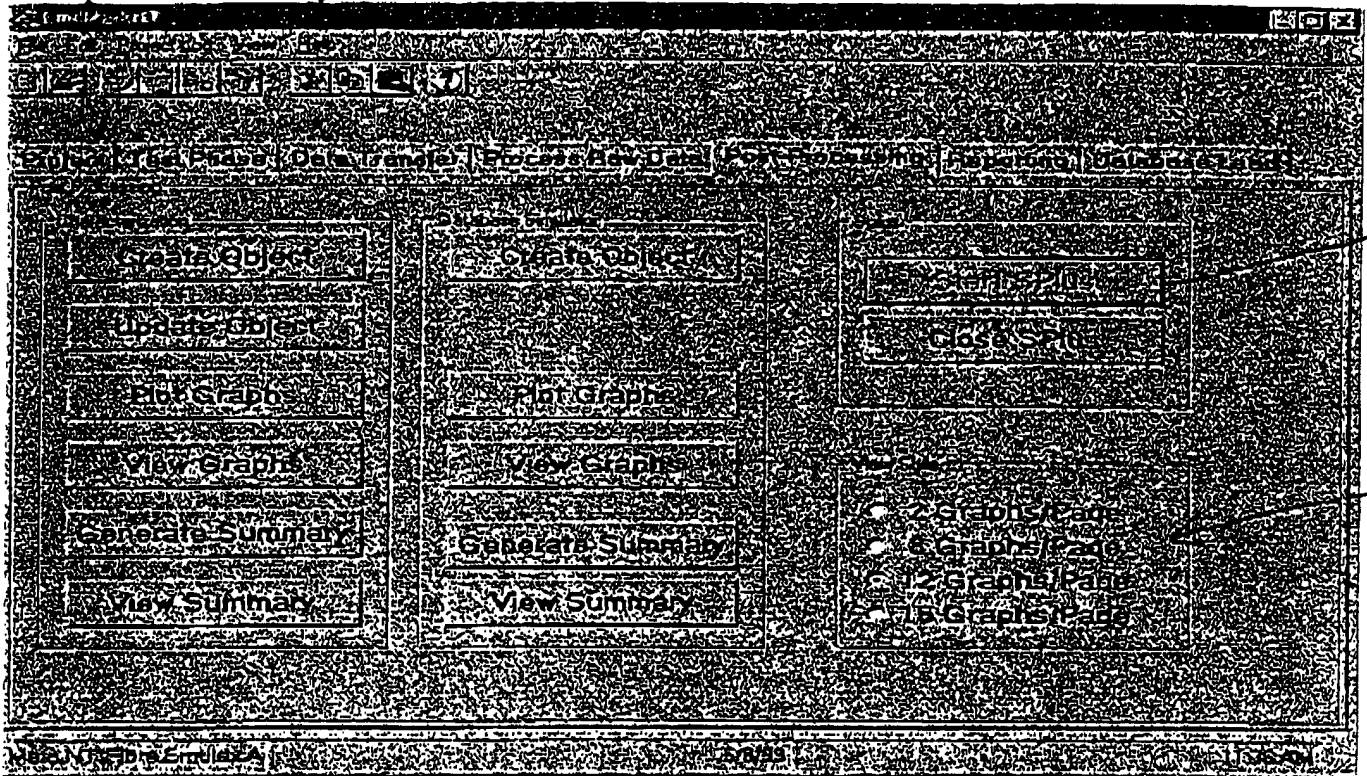
**Starting SPLUS**

Fig. 4

1. Click on the Start Splus Button
(Object buttons will be grayed out until Splus is running. If graphs or summary files have already been created those buttons will be visible)
2. Bring up the Splus window to watch for errors and to use during the Update Objects routine
3. Select 2 graphs/page 8 graphs/page, 12 graphs/page or 15 graphs/page option for viewing the graphs once generated
4. **Process Characterization or Database Simulator objects follow instructions on the next page.**
5. Select the Close Splus button when you are leaving this tab
(If there is a problem closing Splus, bring up the window and close manually. Select NO twice to its Save Reports and Objects questions)

(If you forget to close Splus before you exit the EMCMarkNT Data Reduction Tool you will need to quit out of Splus from the command line by typing q() or by file -> exit)

6. Go to the Reporting Tab

October 13, 1999

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Symmetrix Configuration View

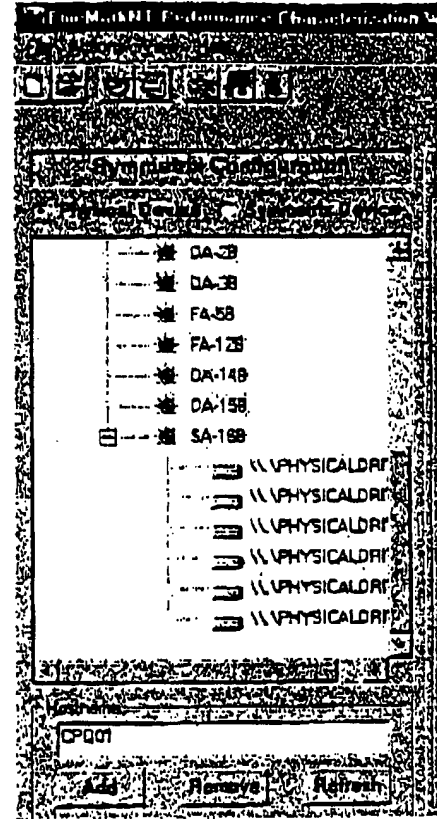
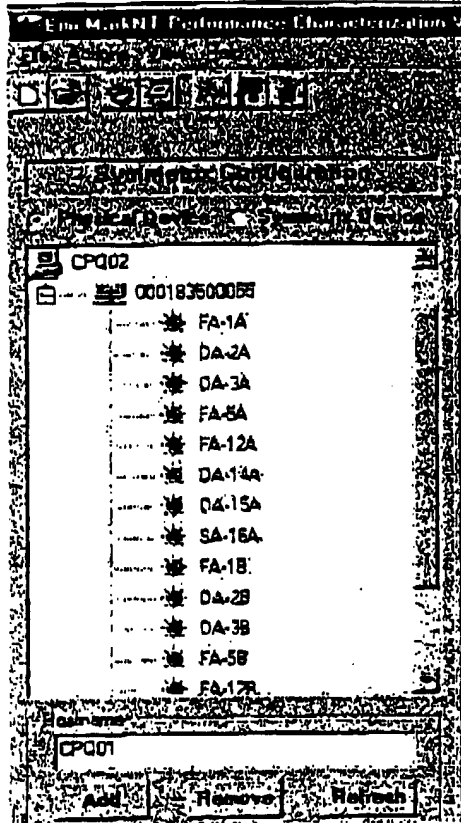
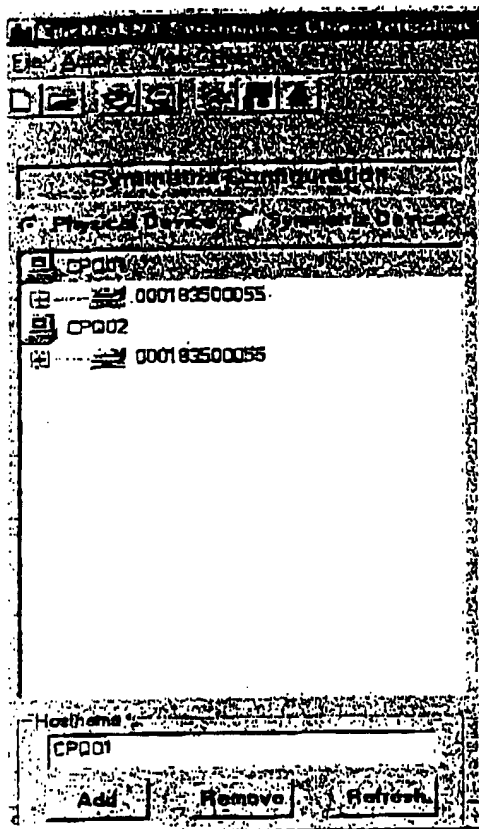


Fig. 9A

Lists the hosts and Symmetrix system

When the Symmetrix is expanded, BAs and DAs and will be displayed. Red indicates inactive and green indicates active

Physical Devices – will list the physical device names connected to the Symmetrix

Symmetrix Devices - will list the Symmetrix device names connected to the Symmetrix

Hostname – is the host highlighted on the list

The first host in the list is considered the Master Host

If no host is listed then the host you are on is considered the Master Host

Local, Remote, Gateway

If the Master Host is the host you are on then the job will run locally

If the Master Host is not the host you are then the job will run remotely, except

If there is a gateway setup in the Environment Tab, then the job will run through the gateway

Add – will add the host name typed in the Hostname box

Remove – will remove the host name typed in the Hostname box

Refresh – will refresh the host/Symmetrix information

Device Details

Device Details			
Vendor:	EMC	Model:	0
Product:	SYMMETRIX	Version:	0
Symmetrix ID:	000183500055	Parent Sym:	2
Device:	SA-16B		
Port Number:	1		
Symmetrix Device			
Symmetrix Device:	000	Block Size:	512
Physical Device:	\\PHYSICALDRME0	Capacity:	7741440
Logical Device:		Cylinder:	8064
Serial Number:	55000321	Emulation:	FBA
Device Status:	Ready	Mirror Policy:	two-way mirror
<input type="checkbox"/> CDD <input type="checkbox"/> META Head <input type="checkbox"/> PowerPath Parent <input type="checkbox"/> RUF <input type="checkbox"/> ASSOC <input type="checkbox"/> META Member <input type="checkbox"/> PowerPath Child <input type="checkbox"/> BGS <input type="checkbox"/> VCM <input type="checkbox"/> Gatekeeper <input type="checkbox"/> PowerPath Sibling <input type="checkbox"/> BCF <input type="checkbox"/> Mass <input type="checkbox"/> Multichannel <input type="checkbox"/> No channel <input type="checkbox"/> META			
OK			

FIG. 9B

Symmetrix Details

Director Details			
Symmetrix			
Director:	FA-1A	Num Ports:	1
Director Type:	Fibre Adapter	Port 0 status:	On
Director Num:	1	Port 1 status:	N/A
Slot Num:	1	Port 2 status:	N/A
SCIS Width:	N/A	Port 3 status:	N/A
OK			

FIG. 9C

Erin Mark M Performance Characterization Workbench

Definition | Environment | Workload | Configuration | Benchmark | Results | Graph

Project Name: Test Phase: Test Description:

Storage Array: Model: Serial: Cache: Code Date:

Field type: Hyper/Pure: Mirror Policy: Cache size: Physical Disk: Disk Type:

Hotframe:

Add Remove Refresh

Project name – The project set up for this test.

- Select the New Project button to setup a new project, or the Open Project button to open a different Project.

Test Phase – the Test Phase setup for this test

- Select the New Test Phase button to setup a new test phase, or the Open Test Phase button to open a different Test phase under this project.

Test Description – comes from the ini file located in the Test Phase/Scripts folder

Storage Array Frame and Details Frame information from the ini file located in the Test Phase/Scripts folder
You can manually update the fields, or if you double click on the Symmetrix box the information gathered from the Symmetrix will be populated into those fields and upon exit will be written to the ini file

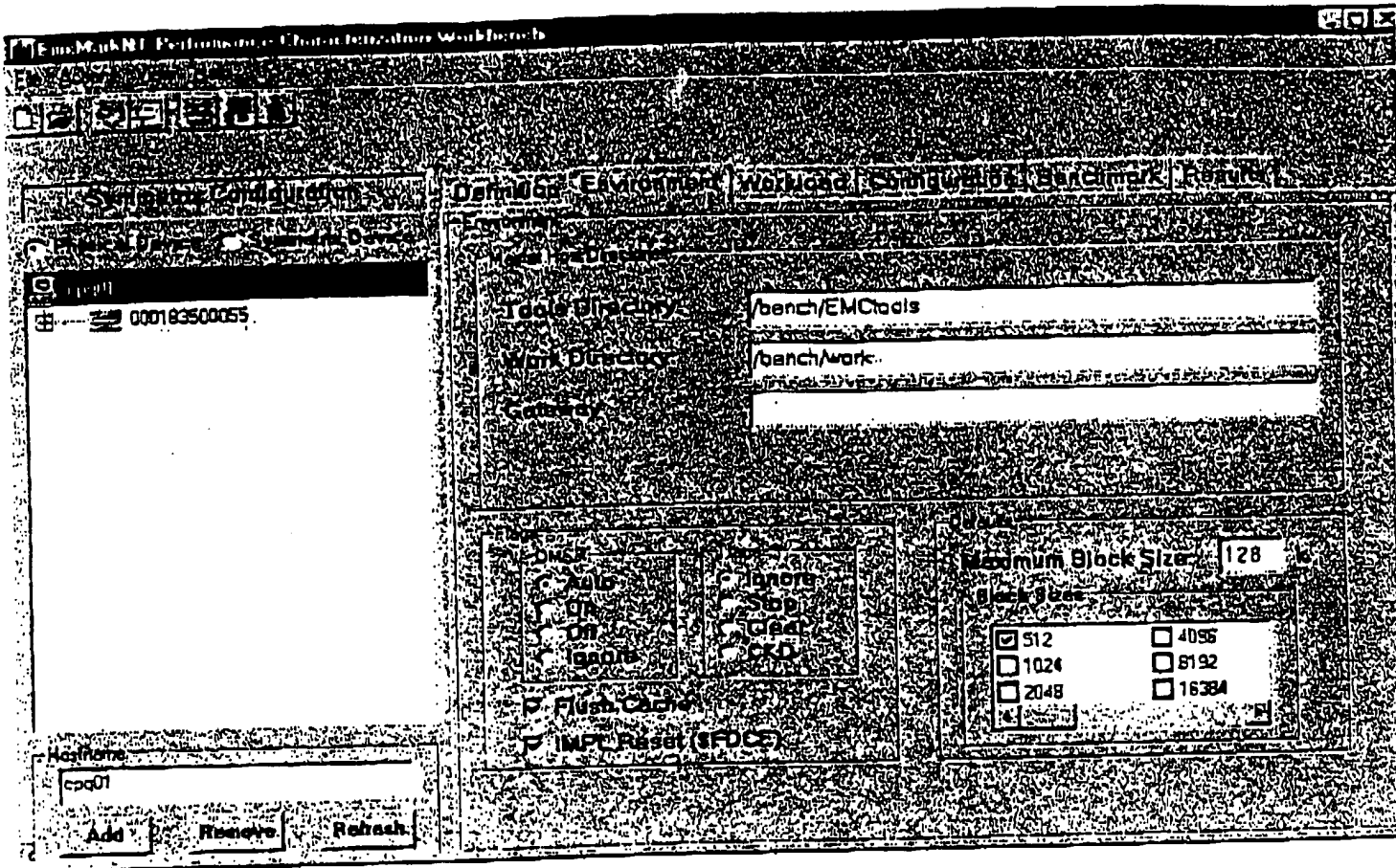


FIG 9E

Tools Directory - where the master scripts are located

Work Directory - your personal work folder

Flags -

DMSP

Trace

Flush Cache -

IMPL Reset (\$FDCE) -

Defaults - Maximum Block size set to 128k

- Default blocks sizes selected for Workload when run directly from the Workbench

Not saved upon exit, must reset each time

008130-031300

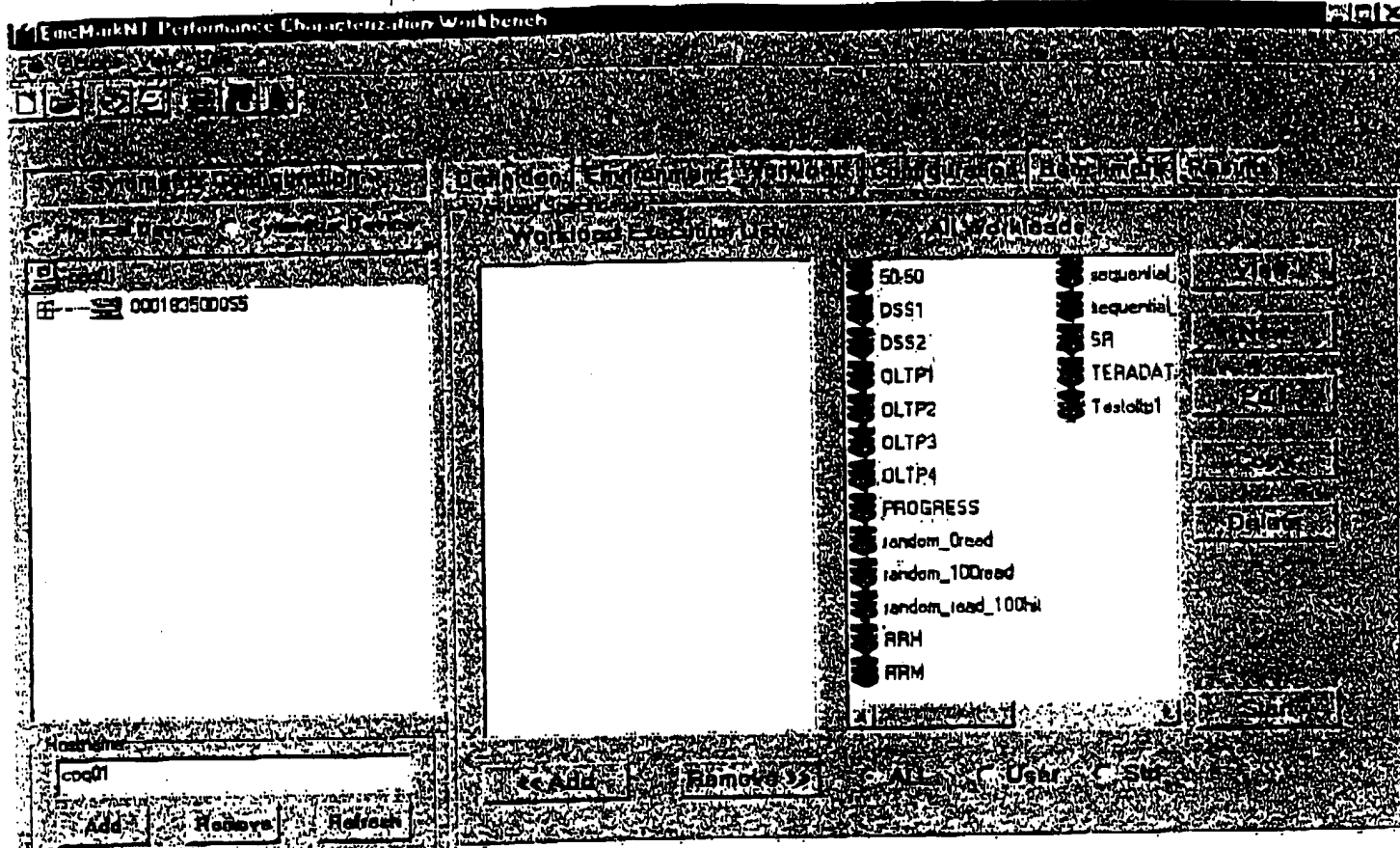


Fig 9 F

All - All available Workloads User - User Defined Workloads Std - Standard Workloads

View - Allows viewing of the detailed definition of a Workloads

New - Brings up the Define Workloads form to define a new Workloads

Edit - Allows editing of User Defined Workloads

Copy - Copies the selected Workload into a new name, then brings up the Edit screen allowing edits to the new Workload.

Delete - Only for User Defined Workloads. Allows the deletion of a Workload.

Add - Moved the selected Workload over to the Workloads Execution List.

Remove - Removes item from the Workloads Execution List to the All Workloads List

Start - Brings up the Workloads Execution form to define and start the Workloads

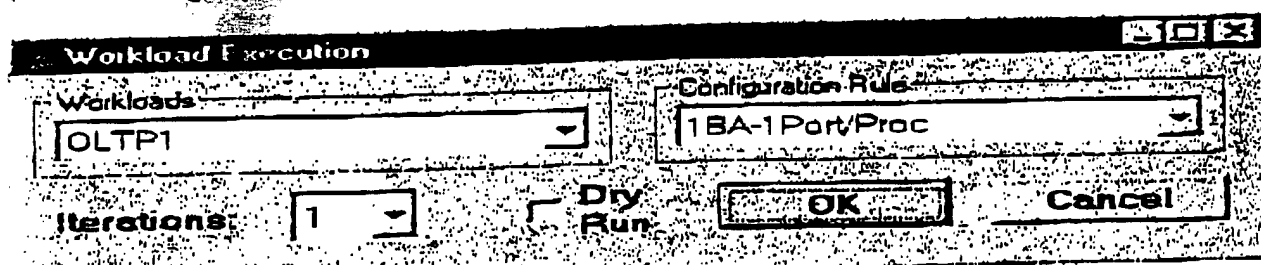


Fig 9 G

Iterations - The number of iterations the Workload should run for

Dry Run - Dry run will run through the scripts but not execute the Workload

OK - Will execute the Workload, bringing up the EmcMark Workload monitor window

Cancel - Will cancel the Workload execution

Response Time Workload

096-479-081800

- Max Seq cannot be ϕ
- Max Seq - max w. Max Seq selection

17-94

Throughput Workload

Workload Description

random_100read

Disk	Cached Size	S/N	Count
1.0	0		20000
Duration (min)	Bytes	Align	Random
30	0	4	0
Offset	Seeker	char/byte	Random Range
4	0	0	0

Workload Transaction Definition

Size	% Workload	% Hit	% Random	% Read	% Write	% Seq. Read	% Seq. Write
0 MB 0 KB 0 B	100	0	100	100	0	0 MB 0 KB 0 B	0 MB 0 KB 0 B

Request Size: MBytes KBytes Bytes

Alignment: MBytes KBytes Bytes

Back Alignment: MBytes KBytes Bytes

In dir: Remove

% of Workload: 100

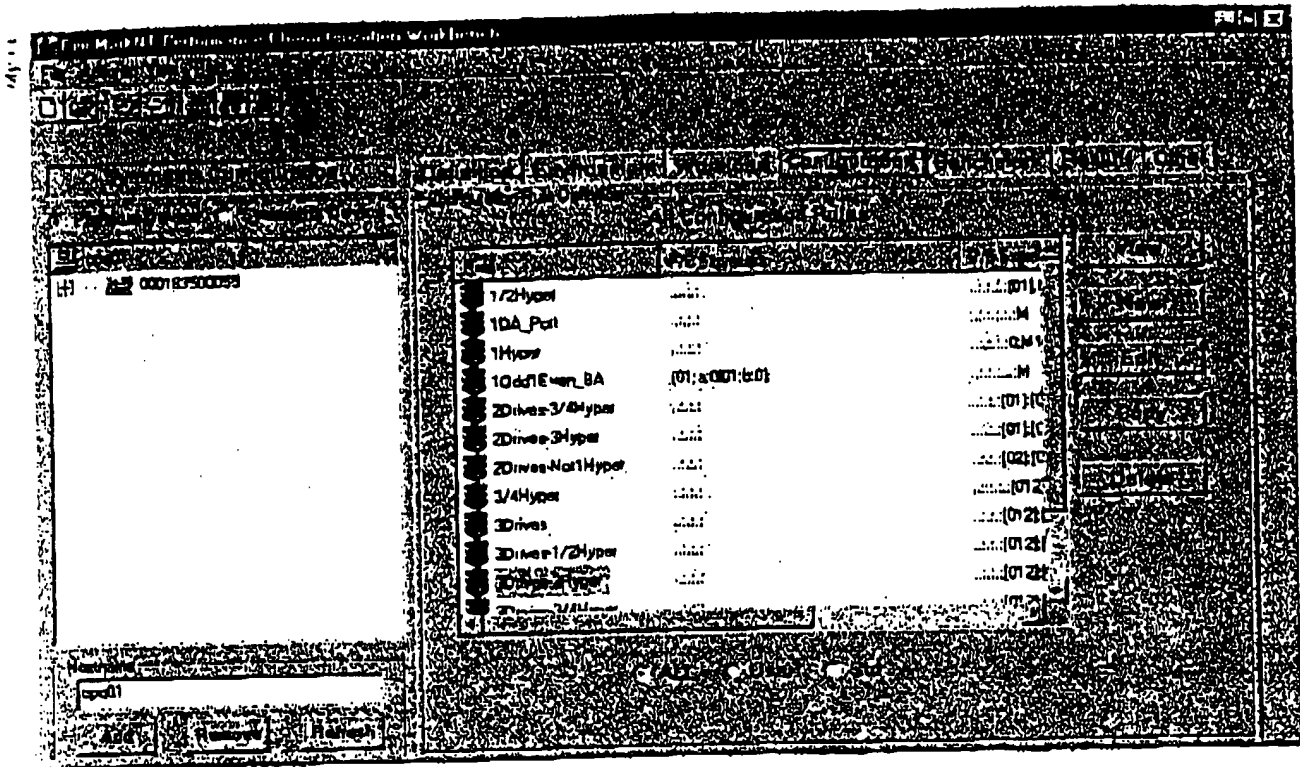
% Cache Misses/Hits: 100 0

% Sequential/Random: 0 100

% Write/Read: 0 100

F10 92

Configuration Tab



All - All available Rules User - User Defined Rules Std - Standard Rules

(Fig. 9)

- View - Allows viewing of the detailed definition of Rule
- New - Brings up the Define Workloads form to define a new Rule
- Edit - Allows editing of User Defined Rules
- Copy - Copies the selected Rule into a new name, then brings up the Edit screen allowing edits to the new Rule.
- Delete - Only for User Defined Rules. Allows the deletion of a Rule.

0001E7500000

Define Configuration

Front End - BA/Processor/Port information pulled from SymAPI if Symmetrix connected
 Back End - DA/Processor/Port information pulled from SymAPI if Symmetrix connected

Mirros, TIDs and Iuns information pulled from SymAPI if Symmetrix connected

All/None buttons toggle checked boxes on or off.

Build Button - will built the expressions if the information has been downloaded from the Symmetrix. If no information is available then the expressions can be manually added to the F/E Expression and B/E Expression boxes.

Update Button - will update the F/E Expression and B/E Expression into the database.

OK will save the rule into the database

Cancel will terminate the definition

FIG 9K

Benchmark Tab

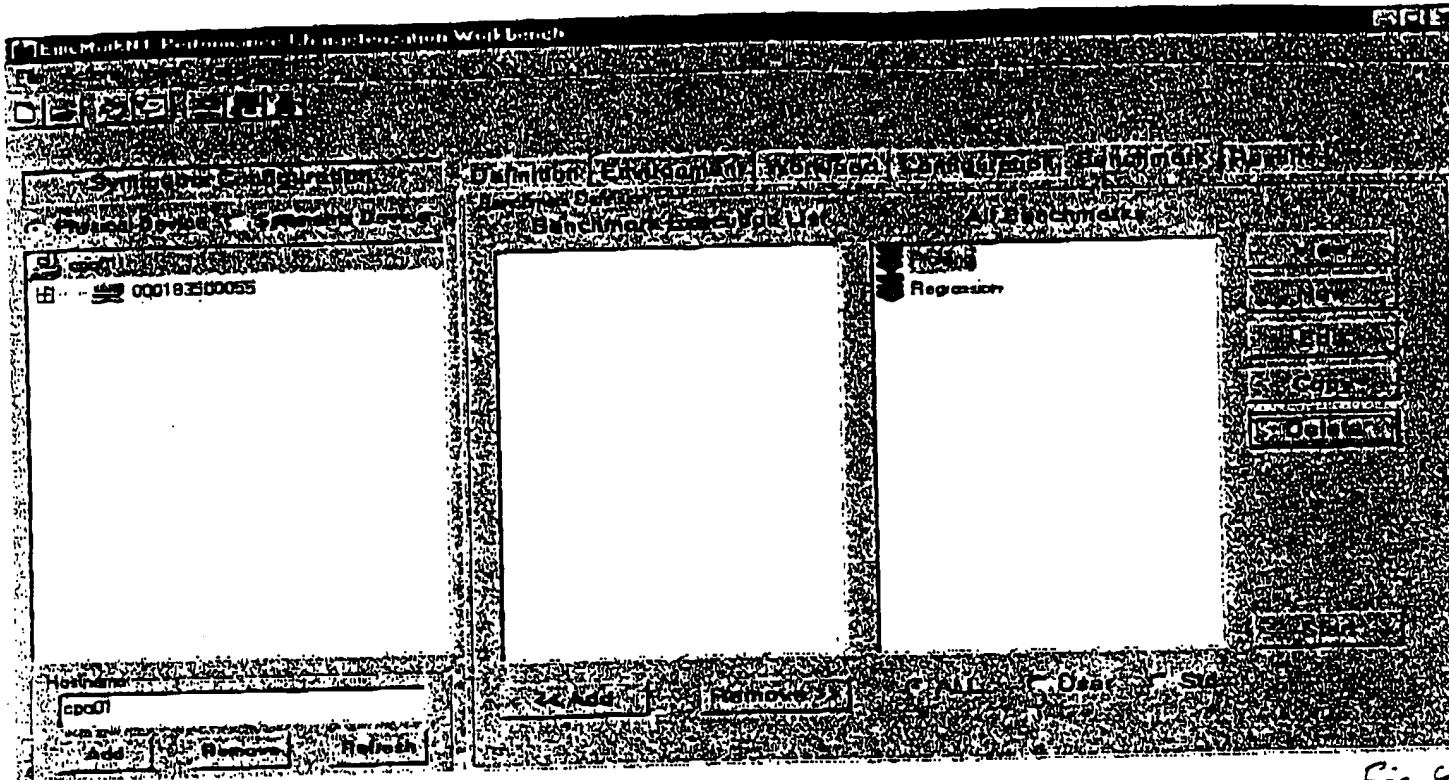


Fig 9

All - All available Benchmarks User - User Defined Benchmarks Std - Standard Benchmarks

- View - Allows viewing of the detailed definition of a benchmark
- New - Brings up the Define Benchmark form to define a new benchmark
- Edit - Allows editing of User Defined Benchmarks
- Copy - Copies the selected benchmark into a new name, then brings up the Edit screen allowing edits to the new benchmark.
- Delete - Only for User Defined Benchmarks. Allows the deletion of a benchmark.
- Add - Moved the selected benchmark over to the Benchmark Execution List. Only one Benchmark can be in the Execution list at a time
- Remove- Removes item from the Benchmark Execution List to the All Benchmarks List
- Start - Brings up the Benchmark Execution form to define and start the benchmark

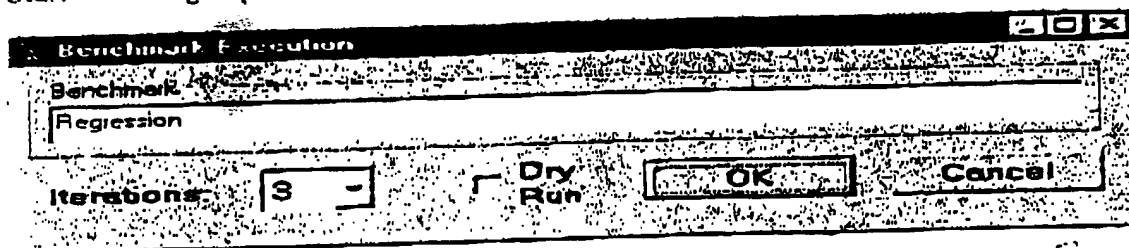


Fig 9.1

- Iterations- The number of iterations the benchmark should run for
- Dry Run - Dry run will run through the scripts but not execute the benchmark
- OK - Will execute the benchmark, bringing up the EmcMark Benchmark monitor window
- Cancel - Will cancel the benchmark execution

Define Benchmark

View Benchmark

Regression

Cache Size

Cache Status

Workload	Configuration Rule	Cache Size	Cache Status	Min Test Period	Max Test Period	Multiplier	Seeks	Slack Bytes	Block Size	Min Sequential Count
RRM	1Hyper	-1	-1							
RRM	Everything	-1	-1							
OLTP1	Everything	-1	-1							
OLTP2	3Hypers/4Drives	-1	-1							
OLTP3	1Hyper/2Drives	-1	-1							
DSS1	1Hyper	-1	-1							
DSS2	Everything	-1	-1							
TERADATA	2Drives/DA-3Hyper/4Drives	-1	-1							

Max Test Period

Min Test Period

Multiplier

Seeks

Slack Bytes

Block Size

Min Sequential Count

Workload

Configuration Rule

Insert

Remove

File 90

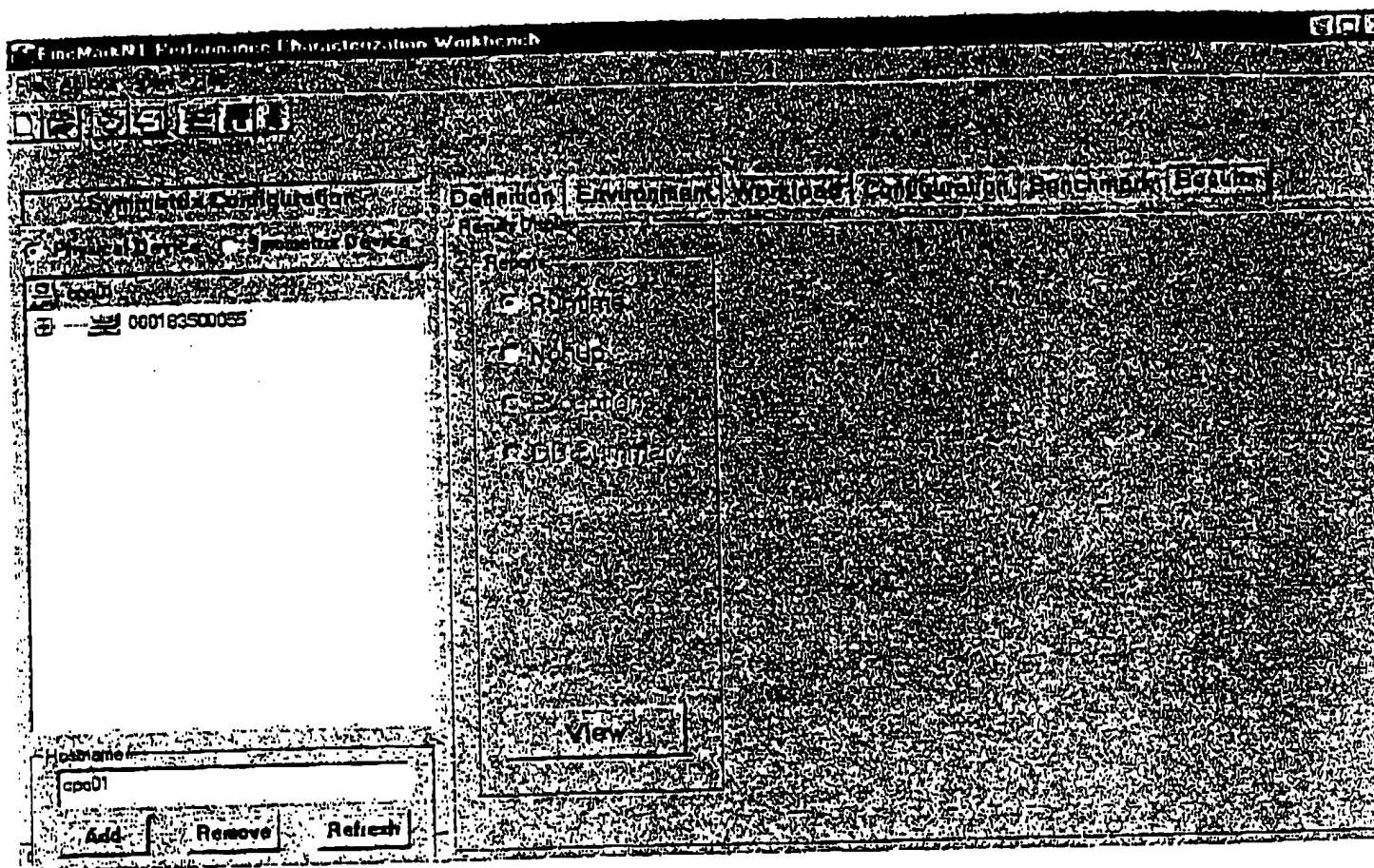


Fig 90

00641773-081800

POST PROCESSING

Check, validate and
consider correction of
data 1002

COMPARE WITH I/O
CONFIGURATION PROFILE 1004

FLAG DEVIATIONS 1006

PLACE RESULTS IN
DATABASE 1010

PRESENTATION &
TRENDS ANALYSIS

FIG. 10

This function is used when your data format is not standard and you need to sort your data in the correct format for Splus to read the file.

Table Properties

Table

Table Variables

Row: config

Column: req. size

Configuration: test.type

Test Description: none

Summary Functions

IO Function: max

MB Function: max

OK Cancel

Fig. 10A

1. Select CTRL A
2. The Advanced Characterization Window will appear
3. Select the correct row/column/configuration/test description options for your data
4. Select the summary functions for your data
5. Select OK
6. A Characterization file will be generated in the Post Processing Folder with the extension _adv.txt

Process Advanced DB Simulator Raw Data File

Advanced Database Simulator Summary	
Table Variables	Summary Functions
Row	IO Function
Configuration	MB Function
Column	

Fig. 10 B

1. Select CTRL B
2. The Advanced DB Simulator Window will appear
3. Select the correct row/column/configuration/test description options for your data
4. Select the summary functions for your data
5. Select OK
6. A DB Simulator file will be generated in the Post Processing Folder with the extension _adv.txt

File Descriptions

File Name	Description	HighLights
Char.Summary	Summary file of each Characterization test broken down by iteration, test type, and configuration	
Char.Splus	Data file feed to Splus to create Characterization Objects	
Char.Errors	Characterization errors produced from processing the raw data files.	Message appears if error file exists.
SX.Summary	SX summary data broken down by iteration, test type and configuration.	
SX.Splus	Data file feed to Splus. Used with Char.Summary file to create Characterization Objects	
SX.Errors	SX errors from processing the raw data files	Message appears if error file exists.
DB.Table	Summary file of each DB Simulator test broken down by iteration, test type and configuration	
DB.Splus	Data file feed to Splus to create DBSimulator Objects	
DB.Errors	DB Simulator errors produced from processing the raw data files	Message appears if error file exists.
SX_DB.Summary	SX DB summary data broken down by iteration, test type and configuration.	
SX_DB.Splus	Data file feed to Splus. Used with DB.Splus file to create DBSimulator Objects	
SX_DB.Errors	SX_DB errors produced from processing the raw data files	Message appears if error file exists.
Cache Ratio Report	Report tracking the Cache ratio from the Sym and the processed data	Report name: "CacheRatioReport.txt" Located in the Raw Data folder Message appears if a report

Fig. 11

00641773-081800

09641773.081800

EmMarkNT Data Reduction Workbench

File Edit Project Log View Help

Project | Test Phase | Data Transfer | Process Raw Data | Post Processing | Reporting | Database | Charts

MSD File: F:\TestArea\Regression.5265.Overnight\Database\symm48.5265

Database: F:\TestArea\Regression.5265.Overnight\Database\symm48.5265 Select DB

Test Type: Random Delayed Fast Write

☒ symm48.5265.libre

☒ Freeze 5265 34.0214.00

☐ Upgrade 38.000000

☐ Upgrade 37.000000

Characterization

Read Size: 512 LDR: 1

Hypers: 1 Drives: 2

Bus: 1 DA: 2

BA Prot: 1 DA Prot: 2

BA Port: 1 DA Port: 2

Type: Online Chart

By Test Type

View All

Scale: Percent Scale

Value Scale

Per Page: 2 6 9 15

4 8 12 16

Load DB Defaults

Chart

F:\TestArea\symm48.5265.libre\code.38.freeze

2/2/00 4:08 PM

Fig. 12